2.3 Drawing Working Units

A. Description

The drafting software has 4,294,967,296 Units of Resolution (UOR) in the x-axis and in the y-axis.

The UOR is the smallest increment of precision to which the drawing data can be stored in the system (i.e., the drawing resolution). The UOR is defined by the seed file, which can then be changed by the user if desired. This is done by assigning values to working units known as Master Units (MU), Sub Units (SU), and Positional Units (PU). This is accomplished by changing the Resolution (number of Positional Units per Sub Units). The maximum Working Area (or design plane size), which can be included in a drawing, is reduced as the precision is increased (more Positional Units defined for the UOR) because the 4 billion UOR is a constant.

B. Units of Resolution for Highway Construction

There is only ONE setting for any CADD prepared Highway Construction project (also includes Highway Planting projects), and it shall be:

Unit Names: Master Units (MU)---------- Meters
Sub Units (SU)---------- Millimeters

Resolution: Sub Units (SU) ---------- 1000 (millimeters per meter)
Positional Units (PU) ----- 10 (Pos. Units per sub unit)

Working Area ----------429,496 (meters square)

The above setting has 10 positional units between each millimeter. This is the only setting for Highway projects and it should never be changed. If the number of positional units was inadvertently increased (more positional units per millimeter), the Working Area (design plane size) would become smaller and the coordinate value of a given precise point would become a different value. The accuracy of measuring and dimensioning would improve, but that is not how Highway projects are handled at Caltrans.

C. Units of Resolution for Structures

Structures will draw to a particular scale by changing the Positional Units. Changing the Positional Units allows the user to draw a second detail at a different desired scale within one design file (plan sheet). Changing the Positional Units will alter the coordinate value of a given precise point in the design file. The Base Working Unit (full size) for Structures is:

Unit Names: Master Units (MU)---------- Meters
Sub Units (SU)---------- Millimeters

Resolution: Sub Units (SU) ---------- 1000 (millimeters per meter)
Positional Units (PU) ----- 10000 (Pos. Units per sub unit)

Working Area ----------429 (meters square)

The table below shows the metric scales that Structures uses. By changing the Positional Units (3rd column) the desired metric scale is achieved (1st column). The Working Area (4th column) will change automatically with the change in Positional Units.

Metric Scales	mm Per m	Pos Units	Working Area m^2	Close English Scale
1:1 (Full Size)	1000	10000	429	1'=1' (Full Scale)
1:2 (Half Size)	1000	5000	858	1'=6" (Half Scale)
1:2.5	1000	4000	1073	3"=1'-0"
1:5	1000	2000	2147	1 1/2 "=1'-0"
1:10	1000	1000	4294	1"=1'-0"
1:20	1000	500	8589	3/4 "=1'-0"
1:25	1000	400	10737	1/2 "=1'-0"
1:40	1000	250	17179	3/8 "=1'-0"
1:50	1000	200	21474	1/4 "=1'-0"
1:80	1000	125	34359	3/16 "=1'-0"
1:100	1000	100	42949	1/10"=1'-0"
1:125	1000	80	53687	3/32 "=1'-0"
1:200	1000	50	85899	1/16 "=1'-0"
1:250	1000	40	107374	1"=20'
1:400	1000	25	171798	1"=30'
1:500	1000	20	214748	1"=40'
1:1000	1000	10	429496	1"=80'
1:2000	1000	5	858993	1"=200'
1:5000	1000	2	2147483	1"=500'
1:10000	1000	1	4294967	1"=1000'